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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,642	06/04/2001	Tomonaga Yamamoto	392.1716	9776

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EXAMINER	
ELKASSABGI, HEBA	

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/871,642	YAMAMOTO ET AL.	
	Examiner	Art Unit	
	Heba Elkassabgi	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *5,6,12,13* is/are allowed.

6)☒ Claim(s) *1-4,7,8-11,14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The *35 USC § 112 of the first and second paragraphs is withdrawn in light of applicant's remarks.*

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim1, 2, 3, 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyata (J.P.02000350393A) and further in view of Abramowitz et al. (Hand Book of Mathematical Functions with Formulas. Graphs. and Mathematical Tables).

Miyata discloses in figures 5 a circular rotor with a plurality of magnetic poles (A) perpendicular central axis of the rotor (B) and that at least one magnetic pole (A) of the plurality of magnetic pole and more than one half of the outer periphery of the pole, a central part of the outer periphery of the one pole and an outer edge are defined by a curve of a function. However, Miyata does not disclose that the function is hyperbolic function.

Abramowitz et al. indicates that the hyperbolic function on page 83 indicates that a relationship between the sine, cosine, and tangent functions exist and the are derived from each other in which a relations ship to a circular function where is clearly stated in

page 83 equation 4.5.8 that Cosh Z+ cos (1 Z), where "i" is the imaginary complex. A combinations of exponential functions with negative powers can be made to fit any contour and can be replaced easily and erected by a combinations of circular functions of cos's and sin's as indicated by the "Handbook of Mathematical Functions" text as referred to above.

It would have been obvious to one of ordinary skill in the art to combine the structure of Miyata with the reference of Abramowitz et al.'s hyperbolic function increase torque in a motor from formulas that use sine, cosine, exponentials, or circular functions.

Claims 8,9,10,11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyata (J.P.02000350393A) and in further view of Nitta et al. (J.P. 406217478) and Abramowitz et al. (Hand Book of Mathematical Functions with Formulas. Graphs. and Mathematical Tables).

Miyata discloses in figures 5 a circular rotor with a plurality of magnetic poles (A) perpendicular central axis of the rotor (B) and that at least one magnetic pole (A) of the plurality of magnetic pole and more than one half of the outer periphery of the pole, a central part of the outer periphery of the one pole and an outer edge are defined by a curve of a function. However, Miyata does not disclose that the function is hyperbolic and that a second region is defined on segments of straight lines and curves.

Nitta et al. discloses in Figure 3 that the second region is defined on segments of straight lines and curves, in order suppress cogging torque

Abramowitz et al. indicates that the hyperbolic function on page 83 indicates that a relationship between the sine, cosine, and tangent functions exist and the are derived from each other in which a relations ship to a circular function where is clearly stated in page 83 equation 4.5.8 that Cosh Z+ cos (1 Z), where "i" is the imaginary complex. A combinations of exponential functions with negative powers can be made to fit any contour and can be replaced easily and erected by a combinations of circular functions of cos's and sin's as indicated by the "Handbook of Mathematical Functions" text as referred to above.

It would have been obvious to one of ordinary skill in the art to combine the structure of Miyata with the second curvature region of in order to suppress cogging torque and to combine the reference of Abramowitz et al.'s hyperbolic function increase torque in a motor from a formulas that use sine, cosine, exponentials, or circular functions.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter: Claims 5,6, 12, and 13, Prior art does not indicate the specific formula that applicant is claiming. Prior art only indicates formulas other then the specific formulas of the applicant, which are able to achieve a hyperbolic graph when implemented.

Response to Arguments

Applicant's arguments filed 11/13/2003 have been fully considered but they are not persuasive.

In regards to applicant's arguments on paragraph 2, applicant states that any curve can be expressed by a combination of cosine functions and the sine functions, which is a matter of course that the hyperbolic cosine curve is expressed by the trigonometric function and that the hyperbolic cosine curve is selected from an infinite number of curves. Which the examiner has made clear with the combination of the reference of Miyata and Abramowitz et al. Miyata discloses the structure and with the combination of Abramowitz et al. which discloses that a hyperbolic function can be derived through various trigonometric function and that an infinite number of functions can define a curvature.

In response to applicants argument that there is no suggestion to combine the references, The Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would have been motivated to make the proposed combination of primary and secondary references. In re Nomiya, 184 USPQ 607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken for combining references as taken as a whole would suggest to one of ordinary skill in the art. In re McLaughlin, 170 USPQ 209 (CCPA 1971). In addition the references are evaluate by what they suggest to be versed in the art, rather than by their specific disclosures. In re Bozek, 163 USPQ

545 (CCPA) 1969. In this case the combination of Miyata which discloses the structure of the claimed invention and with Abrowitz which discloses that a curve can be derived from various trigonometric functions.

In response to Applicants argument that the examiners conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicants disclosure, such a reconstruction is proper. In re McLaughlin, 443 F.2d 1392;1709 USPQ 209 (CCPA 1971).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heba Elkassabgi whose telephone number is (703) 305-2723. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HYE

BURTON S. MULLINS
PRIMARY EXAMINER